

SEQUENCE LISTING

<110> Shyjan, Andrew W.

<120> COMPOSITIONS AND METHODS FOR THE DIAGNOSIS, PREVENTION
AND TREATMENT OF TUMOR PROGRESSION

<130> 07334/004005

<140> US 09/181,030

<141> 1998-10-27

<150> US 08/862,442

<151> 1997-05-23

<150> US 08/623,679

<151> 1996-03-29

<160> 10

<170> FastSEQ for Windows Version 3.0

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<211> 186

<212> DNA

<213> Mus musculus

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<221> CDS

<222> (321)...(1946)

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ctaacagatg	ttgctgtggt	cagctcacta	accagcacat	ccccctttg	ccgagtgggg	180
ctcccagcac	aacaggagag	gacaccaagc	aggcagacac	gcagtccggg	aaatgggtctg	240
tcagcaaaca	caccagagc	tacccaacag	actcctatgg	gattcttgaa	ttccaggggtg	300
ggggttactc	caataaagcc	atg tac atc	cga gtc tcc	tac gac acc	aag cca	353
		Met Tyr Ile Arg Val Ser Tyr Asp Thr Lys Pro				
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gat tcc ctg	ctc cac ctg	atg gtg	aag gac	tgg cag	ctg gag	ctc ccg	401
Asp Ser Leu	Leu His Leu	Met Val Lys	Asp Trp Gln	Leu Glu Leu	Pro		
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aag Lys	ctc Leu	ttg Leu 30	ata Ile	tct Ser	gtg Val	cac His	gga Gly 35	ggc Gly	ctc Leu	caa Gln	agc Ser	ttc Phe 40	gag Glu	atg Met	cag Gln	449
tcc Ser	aaa Lys 45	ctg Leu	aag Lys	cag Gln	gtg Val	ttt Phe 50	ggg Gly	aaa Lys	ggg Gly	ctg Leu	atc Ile 55	aag Lys	gct Ala	gcc Ala	atg Met	497
acc Thr 60	acg Thr	ggg Gly	gcg Ala	tgg Trp	atc Ile 65	ttc Phe	acc Thr	ggg Gly	ggg Gly	gtg Val 70	agc Ser	act Thr	ggg Gly	gtc Val	gtc Val 75	545
agc Ser	cat His	gtg Val	ggg Gly	gat Asp 80	gcc Ala	ttg Leu	aaa Lys	gac Asp	cac His 85	tcc Ser	tcc Ser	aag Lys	tcc Ser	aga Arg 90	ggc Gly	593
cgg Arg	ctc Leu	tgt Cys	gct Ala 95	ata Ile	gga Gly	att Ile	gct Ala	ccc Pro 100	tgg Trp	ggc Gly	atg Met	gtg Val	gag Glu 105	aac Asn	aag Lys	641
gaa Glu	gac Asp	ctg Leu 110	att Ile	gga Gly	aaa Lys	gat Asp	gta Val 115	aca Thr	aga Arg	gtc Val	tat Tyr	cag Gln 120	acc Thr	atg Met	tcc Ser	689
aac Asn	cct Pro 125	ctg Leu	agc Ser	aag Lys	ctc Leu	tct Ser 130	gtg Val	ctc Leu	aac Asn	aat Asn	tcc Ser 135	cac His	act Thr	cac His	ttc Phe	737
atc Ile 140	ttg Leu	gct Ala	gac Asp	aac Asn	ggc Gly 145	acc Thr	ctg Leu	ggc Gly	aag Lys	tat Tyr 150	ggg Gly	gct Ala	gag Glu	gtg Val	aag Lys 155	785
ctt Leu	cga Arg	aga Arg	cag Gln	ctg Leu 160	gaa Glu	aaa Lys	cac His	atc Ile	tcc Ser 165	ctg Leu	cag Gln	aag Lys	atc Ile	aac Asn 170	aca Thr	833
agg Arg	ctg Leu	ggc Gly	cag Gln 175	ggg Gly	gta Val	cct Pro	gtc Val	gtg Val 180	ggc Gly	cta Leu	gtg Val	gta Val 185	gaa Glu	ggg Gly	ggg Gly	881
cct Pro	aac Asn	gtg Val 190	gtt Val	tct Ser	atc Ile	gtc Val	ctg Leu 195	gag Glu	tat Tyr	ctc Leu	aaa Lys	gaa Glu 200	gac Asp	cct Pro	cct Pro	929
gtc Val	cct Pro 205	gtg Val	gtg Val	gtt Val	tgc Cys	gat Asp 210	ggc Gly	agt Ser	gga Gly	cgt Arg	gcc Ala 215	tct Ser	gac Asp	att Ile	ttg Leu	977
tcc Ser 220	ttc Phe	gca Ala	cac His	aaa Lys	tac Tyr 225	tgc Cys	gac Asp	gaa Glu	gga Gly	gga Gly 230	gtc Val	ata Ile	aac Asn	gag Glu	tcc Ser 235	1025
ctg Leu	cgg Arg	gac Asp	cag Gln	ctt Leu 240	cta Leu	gtt Val	acc Thr	att Ile	cag Gln	aaa Lys	aca Thr	ttt Phe	aat Asn	tac Tyr 250	agc Ser	1073
aag Lys	tcc Ser	cag Gln	tcg Ser 255	tat Tyr	cag Gln	ctg Leu	ttt Phe 260	gca Ala	att Ile	atc Ile	atg Met	gag Glu	tgc Cys 265	atg Met	aag Lys	1121

aag	aaa	gaa	ctc	gtc	act	gtg	ttt	cgg	atg	ggt	tcc	gag	ggt	cag	caa	1169
Lys	Lys	Glu	Leu	Val	Thr	Val	Phe	Arg	Met	Gly	Ser	Glu	Gly	Gln	Gln	
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gat	gtc	gag	atg	gca	att	tta	act	gcc	ttg	ctc	aaa	gga	acc	aac	gca	1217
Asp	Val	Glu	Met	Ala	Ile	Leu	Thr	Ala	Leu	Leu	Lys	Gly	Thr	Asn	Ala	
	285					290					295					
tca	gct	cca	gat	cag	ctg	agc	ttg	gcc	ctg	gct	tgg	aac	cgg	gtc	gac	1265
Ser	Ala	Pro	Asp	Gln	Leu	Ser	Leu	Ala	Leu	Ala	Trp	Asn	Arg	Val	Asp	
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ata	gcg	cga	agc	cag	atc	ttc	gtc	ttt	ggc	cca	cac	tgg	ccg	cca	ctg	1313
Ile	Ala	Arg	Ser	Gln	Ile	Phe	Val	Phe	Gly	Pro	His	Trp	Pro	Pro	Leu	
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gga	agc	ctg	gcc	cct	cct	gtg	gac	acc	aaa	gcc	gca	gag	aag	gaa	aag	1361
Gly	Ser	Leu	Ala	Pro	Pro	Val	Asp	Thr	Lys	Ala	Ala	Glu	Lys	Glu	Lys	
			335					340					345			
aag	cca	ccc	aca	gcc	acc	acc	aag	ggg	aga	gga	aaa	gga	aaa	ggc	aag	1409
Lys	Pro	Pro	Thr	Ala	Thr	Thr	Lys	Gly	Arg	Gly	Lys	Gly	Lys	Gly	Lys	
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aag	aaa	ggc	aaa	gtg	aaa	gag	gaa	gtg	gag	gaa	gag	acg	gac	ccc	cgg	1457
Lys	Lys	Gly	Lys	Val	Lys	Glu	Glu	Val	Glu	Glu	Glu	Thr	Asp	Pro	Arg	
	365					370					375					
aag	ctt	gag	ctg	ctc	aac	tgg	gtg	aat	gcc	ctg	gag	caa	gcc	atg	ctg	1505
Lys	Leu	Glu	Leu	Leu	Asn	Trp	Val	Asn	Ala	Leu	Glu	Gln	Ala	Met	Leu	
380					385					390					395	
gat	gct	ctt	gtc	cta	gat	cgg	gtg	gac	ttt	gta	aag	ctc	ctg	att	gaa	1553
Asp	Ala	Leu	Val	Leu	Asp	Arg	Val	Asp	Phe	Val	Lys	Leu	Leu	Ile	Glu	
				400					405					410		
aac	gga	gtg	aac	atg	cag	cat	ttc	ctc	acc	atc	ccg	agg	ctg	gag	gag	1601
Asn	Gly	Val	Asn	Met	Gln	His	Phe	Leu	Thr	Ile	Pro	Arg	Leu	Glu	Glu	
			415					420					425			
cta	tac	aac	acc	aga	ctg	ggc	cca	cca	aac	acc	ctt	cat	ctg	ctg	gtg	1649
Leu	Tyr	Asn	Thr	Arg	Leu	Gly	Pro	Pro	Asn	Thr	Leu	His	Leu	Leu	Val	
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cgg	gat	gta	aag	aag	agc	aac	ctt	cca	cct	gat	tac	cac	atc	agc	ctc	1697
Arg	Asp	Val	Lys	Lys	Ser	Asn	Leu	Pro	Pro	Asp	Tyr	His	Ile	Ser	Leu	
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att	gat	ata	gga	ctg	gtg	ctg	gag	tac	ctc	atg	ggc	ggt	gcc	tac	cgc	1745
Ile	Asp	Ile	Gly	Leu	Val	Leu	Glu	Tyr	Leu	Met	Gly	Gly	Ala	Tyr	Arg	
460					465					470					475	
tgc	aac	tac	act	cgg	aaa	agc	ttc	cgg	act	ctc	tac	aac	aac	ttg	ttt	1793
Cys	Asn	Tyr	Thr	Arg	Lys	Ser	Phe	Arg	Thr	Leu	Tyr	Asn	Asn	Leu	Phe	
				480				485						490		
ggc	cct	aag	agg	gta	gag	ctc	agc	aga	cac	aca	gtg	tcc	tgt	gcc	tcc	1841
Gly	Pro	Lys	Arg	Val	Glu	Leu	Ser	Arg	His	Thr	Val	Ser	Cys	Ala	Ser	
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Gln Ser Asn Met Trp Phe Leu Asp Val Leu Pro Gln Lys Pro Thr Cys
510 515 520

gca gaa tgc aac tct tca cct cac ctg tcc caa act gac atc acc cca 1937
Ala Glu Cys Asn Ser Ser Pro His Leu Ser Gln Thr Asp Ile Thr Pro
525 530 535

cct ctg ccc tgacacccag tgcagggcct cctagctttc acatgcagcc 1986
Pro Leu Pro
540

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35 40 45
Val Phe Gly Lys Gly Leu Ile Lys Ala Ala Met Thr Thr Gly Ala Trp
50 55 60
Ile Phe Thr Gly Gly Val Ser Thr Gly Val Val Ser His Val Gly Asp
65 70 75 80
Ala Leu Lys Asp His Ser Ser Lys Ser Arg Gly Arg Leu Cys Ala Ile
85 90 95
Gly Ile Ala Pro Trp Gly Met Val Glu Asn Lys Glu Asp Leu Ile Gly
100 105 110
Lys Asp Val Thr Arg Val Tyr Gln Thr Met Ser Asn Pro Leu Ser Lys
115 120 125
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130 135 140
Gly Thr Leu Gly Lys Tyr Gly Ala Glu Val Lys Leu Arg Arg Gln Leu
145 150 155 160
Glu Lys His Ile Ser Leu Gln Lys Ile Asn Thr Arg Leu Gly Gln Gly
165 170 175
Val Pro Val Val Gly Leu Val Val Glu Gly Gly Pro Asn Val Val Ser
180 185 190
Ile Val Leu Glu Tyr Leu Lys Glu Asp Pro Pro Val Pro Val Val Val
195 200 205
Cys Asp Gly Ser Gly Arg Ala Ser Asp Ile Leu Ser Phe Ala His Lys
210 215 220
Tyr Cys Asp Glu Gly Gly Val Ile Asn Glu Ser Leu Arg Asp Gln Leu
225 230 235 240

Leu Val Thr Ile Gln Lys Thr Phe Asn Tyr Ser Lys Ser Gln Ser Tyr
 245 250 255
 Gln Leu Phe Ala Ile Ile Met Glu Cys Met Lys Lys Lys Glu Leu Val
 260 265 270
 Thr Val Phe Arg Met Gly Ser Glu Gly Gln Gln Asp Val Glu Met Ala
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 Ile Leu Thr Ala Leu Leu Lys Gly Thr Asn Ala Ser Ala Pro Asp Gln
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 Ile Phe Val Phe Gly Pro His Trp Pro Pro Leu Gly Ser Leu Ala Pro
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 Pro Val Asp Thr Lys Ala Ala Glu Lys Glu Lys Lys Pro Pro Thr Ala
 340 345 350
 Thr Thr Lys Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Gly Lys Val
 355 360 365
 Lys Glu Glu Val Glu Glu Glu Thr Asp Pro Arg Lys Leu Glu Leu Leu
 370 375 380
 Asn Trp Val Asn Ala Leu Glu Gln Ala Met Leu Asp Ala Leu Val Leu
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 Asp Arg Val Asp Phe Val Lys Leu Leu Ile Glu Asn Gly Val Asn Met
 405 410 415
 Gln His Phe Leu Thr Ile Pro Arg Leu Glu Glu Leu Tyr Asn Thr Arg
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 Leu Gly Pro Pro Asn Thr Leu His Leu Leu Val Arg Asp Val Lys Lys
 435 440 445
 Ser Asn Leu Pro Pro Asp Tyr His Ile Ser Leu Ile Asp Ile Gly Leu
 450 455 460
 Val Leu Glu Tyr Leu Met Gly Gly Ala Tyr Arg Cys Asn Tyr Thr Arg
 465 470 475 480
 Lys Ser Phe Arg Thr Leu Tyr Asn Asn Leu Phe Gly Pro Lys Arg Val
 485 490 495
 Glu Leu Ser Arg His Thr Val Ser Cys Ala Ser Gln Ser Asn Met Trp
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Val Ser Tyr Asp Thr Lys Pro Asp Ser Leu Leu His Leu Met Val Lys						
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gat tgg cag ctg gaa ctc ccc aag ctc tta ata tct gtg cat gga ggc						453
Asp Trp Gln Leu Glu Leu Pro Lys Leu Leu Ile Ser Val His Gly Gly						
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ctc cag aac ttt gag atg cag ccc aag ctg aaa caa gtc ttt ggg aaa						501
Leu Gln Asn Phe Glu Met Gln Pro Lys Leu Lys Gln Val Phe Gly Lys						
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ggc ctg atc aag gct gct atg acc acc ggg gcc tgg atc ttc acc ggg						549
Gly Leu Ile Lys Ala Ala Met Thr Thr Gly Ala Trp Ile Phe Thr Gly						
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ggt gtc agc aca ggt gtt atc agc cac gta ggg gat gcc ttg aaa gac						597
Gly Val Ser Thr Gly Val Ile Ser His Val Gly Asp Ala Leu Lys Asp						
	70		75		80	
cac tcc tcc aag tcc aga ggc cgg gtt tgt gct ata gga att gct cca						645
His Ser Ser Lys Ser Arg Gly Arg Val Cys Ala Ile Gly Ile Ala Pro						
	85		90		95	100
tgg ggc atc gtg gag aat aag gaa gac ctg gtt gga aag gat gta aca						693
Trp Gly Ile Val Glu Asn Lys Glu Asp Leu Val Gly Lys Asp Val Thr						
	105		110		115	
aga gtg tac cag acc atg tcc aac cct cta agt aag ctc tct gtg ctc						741
Arg Val Tyr Gln Thr Met Ser Asn Pro Leu Ser Lys Leu Ser Val Leu						
	120		125		130	
aac aac tcc cac acc cac ttc atc ctg gct gac aat ggc acc ctg ggc						789
Asn Asn Ser His Thr His Phe Ile Leu Ala Asp Asn Gly Thr Leu Gly						
	135		140		145	
aag tat ggc gcc gag gtg aag ctg cga agg ctg ctg gaa aag cac atc						837
Lys Tyr Gly Ala Glu Val Lys Leu Arg Arg Leu Leu Glu Lys His Ile						
	150		155		160	
tcc ctc cag aag atc aac aca aga ctg ggg cag ggc gtg ccc ctc gtg						885
Ser Leu Gln Lys Ile Asn Thr Arg Leu Gly Gln Gly Val Pro Leu Val						
	165		170		175	180

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Gly Leu Val Val Glu Gly Gly Pro Asn Val Val Ser Ile Val Leu Glu	
185 190 195	
tac ctg caa gaa gag cct ccc atc cct gtg gtg att tgt gat ggc agc	981
Tyr Leu Gln Glu Glu Pro Pro Ile Pro Val Val Ile Cys Asp Gly Ser	
200 205 210	
gga cgt gcc tcg gac atc ctg tcc ttt gcg cac aag tac tgt gaa gaa	1029
Gly Arg Ala Ser Asp Ile Leu Ser Phe Ala His Lys Tyr Cys Glu Glu	
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Gly Gly Ile Ile Asn Glu Ser Leu Arg Glu Gln Leu Leu Val Thr Ile	
230 235 240	
cag aaa aca ttt aat tat aat aag gca caa tca cat cag ctg ttt gca	1125
Gln Lys Thr Phe Asn Tyr Asn Lys Ala Gln Ser His Gln Leu Phe Ala	
245 250 255 260	
att ata atg gag tgc atg aag aag aaa gaa ctc gtc act gtg ttc aga	1173
Ile Ile Met Glu Cys Met Lys Lys Lys Glu Leu Val Thr Val Phe Arg	
265 270 275	
atg ggt tct gag ggc cag cag gac atc gag atg gca att tta act gcc	1221
Met Gly Ser Glu Gly Gln Gln Asp Ile Glu Met Ala Ile Leu Thr Ala	
280 285 290	
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Leu Leu Lys Gly Thr Asn Val Ser Ala Pro Asp Gln Leu Ser Leu Ala	
295 300 305	
ctg gct tgg aac cgc gtg gac ata gca cga agc cag atc ttt gtc ttt	1317
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Gly Pro His Trp Thr Pro Leu Gly Ser Leu Ala Pro Pro Thr Asp Ser	
325 330 335 340	
aaa gcc acg gag aag gag aag aag cca ccc atg gcc acc acc aag gga	1413
Lys Ala Thr Glu Lys Glu Lys Lys Pro Pro Met Ala Thr Thr Lys Gly	
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Val Glu Glu Glu Thr Asp Pro Arg Lys Ile Glu Leu Leu Asn Trp Val	
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Asp Phe Val Lys Leu Leu Ile Glu Asn Gly Val Asn Met Gln His Phe	
405 410 415 420	

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Met Leu Leu Thr Asp Met Trp Met Gly Arg Leu Arg Met Arg Lys Asn	
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ccc ggc ctg aag gtt atc atg ggg att ctt cta ccc ccc acc atc ttg	2421
Pro Gly Leu Lys Val Ile Met Gly Ile Leu Leu Pro Pro Thr Ile Leu	
680 685 690	
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Phe Leu Glu Phe Arg Thr Tyr Asp Asp Phe Ser Tyr Gln Thr Ser Lys	
695 700 705	
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Glu Asn Glu Asp Gly Lys Glu Lys Glu Glu Glu Asn Thr Asp Ala Asn	
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Gln Arg Ile Ile Pro Ile Gly Thr Lys Ile Cys Lys Phe Tyr Asn Ala	
745 750 755	
ccc att gtc aag ttc tgg ttt tac aca ata tca tac ttg ggc tac ctg	2661
Pro Ile Val Lys Phe Trp Phe Tyr Thr Ile Ser Tyr Leu Gly Tyr Leu	
760 765 770	
ctg ctg ttt aac tac gtc atc ctg gtg cgg atg gat ggc tgg ccg tcc	2709
Leu Leu Phe Asn Tyr Val Ile Leu Val Arg Met Asp Gly Trp Pro Ser	
775 780 785	
ctc cag gag tgg atc gtc atc tcc tac atc gtg agc ctg gcg tta gag	2757
Leu Gln Glu Trp Ile Val Ile Ser Tyr Ile Val Ser Leu Ala Leu Glu	
790 795 800	
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Lys Ile Arg Glu Ile Leu Met Ser Glu Pro Gly Lys Leu Ser Gln Lys	
805 810 815 820	
atc aaa gtt tgg ctt cag gag tac tgg aac atc aca gat ctc gtg gcc	2853
Ile Lys Val Trp Leu Gln Glu Tyr Trp Asn Ile Thr Asp Leu Val Ala	
825 830 835	
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Ile Ser Thr Phe Met Ile Gly Ala Met Ala Thr Arg Ser Val Met Met	
840 845 850	
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Ile Gly Lys Met Met Ile Asp Met Leu Tyr Phe Val Val Ile Met Leu	
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Val Val Leu Met Ser Phe Gly Val Ala Arg Gln Ala Ile Leu His Pro	
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Glu Glu Lys Pro Ser Trp Lys Leu Ala Arg Asn Ile Phe Tyr Met Pro	
885 890 895 900	

tac tgg atg atc tat gga gag gtg ttt gca gac cag ata gac ctc tac	3093
Tyr Trp Met Ile Tyr Gly Glu Val Phe Ala Asp Gln Ile Asp Leu Tyr	
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Ala Met Glu Ile Asn Pro Pro Cys Gly Glu Asn Leu Tyr Asp Glu Glu	
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Gly Lys Arg Leu Pro Pro Cys Ile Pro Gly Ala Trp Leu Thr Pro Ala	
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ctc atg gcg tgc tat cta ctg gtc gcc aac atc ctg ctg gtg aac ctg	3237
Leu Met Ala Cys Tyr Leu Leu Val Ala Asn Ile Leu Leu Val Asn Leu	
950 955 960	
ctg att gct gtg ttc aac aat acc ttc ttt gaa gta aaa tca ata tcc	3285
Leu Ile Ala Val Phe Asn Asn Thr Phe Phe Glu Val Lys Ser Ile Ser	
965 970 975 980	
aac cag gtg tgg aag ttc cag cga tat cag ctg att atg aca ttt cat	3333
Asn Gln Val Trp Lys Phe Gln Arg Tyr Gln Leu Ile Met Thr Phe His	
985 990 995	
gac agg cca gtc ctg ccc cca ccg atg atc att tta agc cac atc tac	3381
Asp Arg Pro Val Leu Pro Pro Pro Met Ile Ile Leu Ser His Ile Tyr	
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Ile Ile Ile Met Arg Leu Ser Gly Arg Cys Arg Lys Lys Arg Glu Gly	
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gac caa gag gaa cgg gat cgt gga ttg aag ctc ttc ctt agc gac gag	3477
Asp Gln Glu Glu Arg Asp Arg Gly Leu Lys Leu Phe Leu Ser Asp Glu	
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gag cta aag agg ctg cat gag ttc gag gag cag tgc gtg cag gag cac	3525
Glu Leu Lys Arg Leu His Glu Phe Glu Glu Gln Cys Val Gln Glu His	
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ttc cgg gag aag gag gat gag cag cag tgc tcc agc gac gag cgc atc	3573
Phe Arg Glu Lys Glu Asp Glu Gln Gln Ser Ser Ser Asp Glu Arg Ile	
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Arg Val Thr Ser Glu Arg Val Glu Asn Met Ser Met Arg Leu Glu Glu	
1080 1085 1090	
atc aat gaa aga gaa act ttt atg aaa act tcc ctg cag act gtt gac	3669
Ile Asn Glu Arg Glu Thr Phe Met Lys Thr Ser Leu Gln Thr Val Asp	
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Leu Arg Leu Ala Gln Leu Glu Glu Leu Ser Asn Arg Met Val Asn Ala	
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Leu Glu Asn Leu Ala Gly Ile Asp Arg Ser Asp Leu Ile Gln Ala Arg	
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gta gat gac tta aag aac gct gaa gag tca aaa tta ggt cca gat att Val Asp Asp Leu Lys Asn Ala Glu Glu Ser Lys Leu Gly Pro Asp Ile 1240 1245 1250	4101
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gac aaa tca gat gtt caa aac act cag cta aca gtg gaa acg aca aat Asp Lys Ser Asp Val Gln Asn Thr Gln Leu Thr Val Glu Thr Thr Asn 1285 1290 1295 1300	4245
ata gaa ggc act att tcc tat ccc ctg gaa gaa acc aaa att aca cgc Ile Glu Gly Thr Ile Ser Tyr Pro Leu Glu Glu Thr Lys Ile Thr Arg 1305 1310 1315	4293
tat ttc ccc gat gaa acg atc aat gct tgt aaa aca atg aag tcc aga Tyr Phe Pro Asp Glu Thr Ile Asn Ala Cys Lys Thr Met Lys Ser Arg 1320 1325 1330	4341
agc ttc gtc tat tcc cgg gga aga aag ctg gtc ggt ggg gtt aac cag Ser Phe Val Tyr Ser Arg Gly Arg Lys Leu Val Gly Gly Val Asn Gln 1335 1340 1345	4389
gat gta gag tac agt tca atc acg gac cag caa ttg acg acg gaa tgg Asp Val Glu Tyr Ser Ser Ile Thr Asp Gln Gln Leu Thr Thr Glu Trp 1350 1355 1360	4437
caa tgc caa gtt caa aag atc acg cgc tct cat agc aca gat att cct Gln Cys Gln Val Gln Lys Ile Thr Arg Ser His Ser Thr Asp Ile Pro 1365 1370 1375 1380	4485

tac att gtg tgc gaa gct gca gtg caa gct gag caa aaa gag cag ttt	4533
Tyr Ile Val Ser Glu Ala Ala Val Gln Ala Glu Gln Lys Glu Gln Phe	
1385 1390 1395	
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Ala Asp Met Gln Asp Glu His His Val Ala Glu Ala Ile Pro Arg Ile	
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cct cgc ttg tcc cta acc att act gac aga aat ggg atg gaa aac tta	4629
Pro Arg Leu Ser Leu Thr Ile Thr Asp Arg Asn Gly Met Glu Asn Leu	
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ctg tct gtg aag cca gat caa act ttg gga ttc cca tct ctc agg tca	4677
Leu Ser Val Lys Pro Asp Gln Thr Leu Gly Phe Pro Ser Leu Arg Ser	
1430 1435 1440	
aaa agt tta cat gga cat cct agg aat gtg aaa tcc att cag gga aag	4725
Lys Ser Leu His Gly His Pro Arg Asn Val Lys Ser Ile Gln Gly Lys	
1445 1450 1455 1460	
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Leu Asp Arg Ser Gly His Ala Ser Ser Val Ser Ser Leu Val Ile Val	
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Ser Gly Met Thr Ala Glu Glu Lys Lys Val Lys Lys Glu Lys Ala Ser	
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Val His Gly Lys Gly Leu Gln Asn Phe Glu Met Gln Pro Lys Leu Lys Gln	
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Ala Leu Lys Asp His Ser Ser Lys Ser Arg Gly Arg Val Cys Ala Ile	
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Gly Ile Ala Pro Trp Gly Ile Val Glu Asn Lys Glu Asp Leu Val Gly	
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Lys Asp Val Thr Arg Val Tyr Gln Thr Met Ser Asn Pro Leu Ser Lys	
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Leu Ser Val Leu Asn Asn Ser His Thr His Phe Ile Leu Ala Asp Asn	
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Gly Thr Leu Gly Lys Tyr Gly Ala Glu Val Lys Leu Arg Arg Leu Leu	
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Pro	Thr	Ile	Leu	Phe	Leu	Glu	Phe	Arg	Thr	Tyr	Asp	Asp	Phe	Ser	Tyr
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Gln	Thr	Ser	Lys	Glu	Asn	Glu	Asp	Gly	Lys	Glu	Lys	Glu	Glu	Glu	Asn
705					710					715					720
Thr	Asp	Ala	Asn	Ala	Asp	Ala	Gly	Ser	Arg	Lys	Gly	Asp	Glu	Glu	Asn
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Glu	His	Lys	Lys	Gln	Arg	Ile	Ile	Pro	Ile	Gly	Thr	Lys	Ile	Cys	Lys
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Phe	Tyr	Asn	Ala	Pro	Ile	Val	Lys	Phe	Trp	Phe	Tyr	Thr	Ile	Ser	Tyr
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Gly	Trp	Pro	Ser	Leu	Gln	Glu	Trp	Ile	Val	Ile	Ser	Tyr	Ile	Val	Ser
785					790					795					800
Leu	Ala	Leu	Glu	Lys	Ile	Arg	Glu	Ile	Leu	Met	Ser	Glu	Pro	Gly	Lys
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Leu	Ser	Gln	Lys	Ile	Lys	Val	Trp	Leu	Gln	Glu	Tyr	Trp	Asn	Ile	Thr
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Asp	Leu	Val	Ala	Ile	Ser	Thr	Phe	Met	Ile	Gly	Ala	Met	Ala	Thr	Arg
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Ser	Val	Met	Met	Ile	Gly	Lys	Met	Met	Ile	Asp	Met	Leu	Tyr	Phe	Val
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Ile	Leu	His	Pro	Glu	Glu	Lys	Pro	Ser	Trp	Lys	Leu	Ala	Arg	Asn	Ile
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Leu	Thr	Pro	Ala	Leu	Met	Ala	Cys	Tyr	Leu	Leu	Val	Ala	Asn	Ile	Leu
945					950					955					960
Leu	Val	Asn	Leu	Leu	Ile	Ala	Val	Phe	Asn	Asn	Thr	Phe	Phe	Glu	Val
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Lys	Ser	Ile	Ser	Asn	Gln	Val	Trp	Lys	Phe	Gln	Arg	Tyr	Gln	Leu	Ile
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Met	Thr	Phe	His	Asp	Arg	Pro	Val	Leu	Pro	Pro	Pro	Met	Ile	Ile	Leu
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Met	Val	Asn	Ala	Leu	Glu	Asn	Leu	Ala	Gly	Ile	Asp	Arg	Ser	Asp	Leu
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Ile	Gln	Ala	Arg	Ser	Arg	Ala	Ser	Ser	Glu	Cys	Glu	Ala	Thr	Tyr	Leu
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 Tyr His Phe Asn Gly Glu Glu Leu Leu Phe Glu Asp Thr Ser Leu Ser
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 Thr Ser Pro Gly Thr Gly Val Arg Lys Lys Thr Cys Ser Phe Arg Ile
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 Lys Glu Glu Lys Asp Val Lys Thr His Leu Val Pro Glu Cys Gln Asn
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 Ser Leu His Leu Ser Leu Gly Thr Ser Thr Ser Ala Thr Pro Asp Gly
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 Ser His Leu Ala Val Asp Asp Leu Lys Asn Ala Glu Glu Ser Lys Leu
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 Gly Pro Asp Ile Gly Ile Ser Lys Glu Asp Asp Glu Arg Gln Thr Asp
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 Ser Lys Lys Glu Glu Thr Ile Ser Pro Ser Leu Asn Lys Thr Asp Val
 1265 1270 1275 128
 Ile His Gly Gln Asp Lys Ser Asp Val Gln Asn Thr Gln Leu Thr Val
 1285 1290 1295
 Glu Thr Thr Asn Ile Glu Gly Thr Ile Ser Tyr Pro Leu Glu Glu Thr
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 Thr Thr Glu Trp Gln Cys Gln Val Gln Lys Ile Thr Arg Ser His Ser
 1365 1370 1375
 Thr Asp Ile Pro Tyr Ile Val Ser Glu Ala Ala Val Gln Ala Glu Gln
 1380 1385 1390
 Lys Glu Gln Phe Ala Asp Met Gln Asp Glu His His Val Ala Glu Ala
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 Ile Pro Arg Ile Pro Arg Leu Ser Leu Thr Ile Thr Asp Arg Asn Gly
 1410 1415 1420
 Met Glu Asn Leu Leu Ser Val Lys Pro Asp Gln Thr Leu Gly Phe Pro
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 Ser Leu Arg Ser Lys Ser Leu His Gly His Pro Arg Asn Val Lys Ser
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 Ile Gln Gly Lys Leu Asp Arg Ser Gly His Ala Ser Ser Val Ser Ser
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catatccccc ctctgccaaag tgcaacaccc agcaaaaatg aagaggaaaag caaacaggtg	240
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Tyr	Leu	Met	Gly	Gly	Ala	Tyr	Arg	Cys	Asn	Tyr	Thr	Arg	Lys	Asn	Phe	
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Lys	Leu	Leu	Gly	Met	Glu	Asp	Asp	Glu	Pro	Pro	Ala	Lys	Gly	Lys	Lys	
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Lys	Lys	Lys	Lys	Lys	Lys	Glu	Glu	Glu	Ile	Asp	Ile	Asp	Val	Asp	Asp	
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cct	gcc	gtg	agt	cgg	ttc	cag	tat	ccc	ttc	cac	gag	ctg	atg	gtg	tgg	1989
Pro	Ala	Val	Ser	Arg	Phe	Gln	Tyr	Pro	Phe	His	Glu	Leu	Met	Val	Trp	
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Ala	Val	Leu	Met	Lys	Arg	Gln	Lys	Met	Ala	Val	Phe	Leu	Trp	Gln	Arg	
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Gly	Glu	Glu	Ser	Met	Ala	Lys	Ala	Leu	Val	Ala	Cys	Lys	Leu	Tyr	Lys	
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Ala	Met	Ala	His	Glu	Ser	Ser	Glu	Ser	Asp	Leu	Val	Asp	Asp	Ile	Ser	
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Gln	Asp	Leu	Asp	Asn	Asn	Ser	Lys	Asp	Phe	Gly	Gln	Leu	Ala	Leu	Glu	
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Leu	Leu	Asp	Gln	Ser	Tyr	Lys	His	Asp	Glu	Gln	Ile	Ala	Met	Lys	Leu	
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Leu	Thr	Tyr	Glu	Leu	Lys	Asn	Trp	Ser	Asn	Ser	Thr	Cys	Leu	Lys	Leu	
	630					635					640					
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Ala	Val	Ala	Ala	Lys	His	Arg	Asp	Phe	Ile	Ala	His	Thr	Cys	Ser	Gln	
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Met	Leu	Leu	Thr	Asp	Met	Trp	Met	Gly	Arg	Leu	Arg	Met	Arg	Lys	Asn	
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Pro	Gly	Leu	Lys	Val	Ile	Met	Gly	Ile	Leu	Leu	Pro	Pro	Thr	Ile	Leu	
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Phe	Leu	Glu	Phe	Arg	Thr	Tyr	Asp	Asp	Phe	Ser	Tyr	Gln	Thr	Ser	Lys	
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Gln Arg Ser Ile Pro Ile Gly Thr Lys Ile Cys Glu Phe Tyr Asn Ala	
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Tyr Met Gly Tyr Gly Arg Val Ile Tyr Cys Val Asp Ile Ile Phe Trp	
855 860 865	
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Tyr Ile Arg Val Leu Asp Ile Phe Gly Val Asn Lys Tyr Leu Gly Pro	
870 875 880	
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Tyr Val Met Met Ile Gly Lys Met Met Ile Asp Met Leu Tyr Phe Val	
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Val Ile Met Leu Val Val Leu Met Ser Phe Gly Val Ala Arg Gln Ala	
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Phe Tyr Met Pro Tyr Trp Met Ile Tyr Gly Glu Val Phe Ala Asp Gln	
935 940 945	

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tat cat ttt aac gga gaa gag tta tta ttt gag gat aca tct ctc tcc Tyr His Phe Asn Gly Glu Glu Leu Leu Phe Glu Asp Thr Ser Leu Ser 1205 1210 1215 1220	4005
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aag gaa gag aag gac gtg aaa acg cac cta gtc cca gaa tgt cag aac Lys Glu Glu Lys Asp Val Lys Thr His Leu Val Pro Glu Cys Gln Asn 1240 1245 1250	4101
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agt cac ctt gca gta gat gac tta aag aac gct gaa gag tca aaa tta Ser His Leu Ala Val Asp Asp Leu Lys Asn Ala Glu Glu Ser Lys Leu 1270 1275 1280	4197
ggg cca gat att ggg att tca aag gaa gat gat gaa aga cag aca gac Gly Pro Asp Ile Gly Ile Ser Lys Glu Asp Asp Glu Arg Gln Thr Asp 1285 1290 1295 1300	4245
tct aaa aaa gaa gaa act att tcc cca agt tta aat aaa aca gat gtg Ser Lys Lys Glu Glu Thr Ile Ser Pro Ser Leu Asn Lys Thr Asp Val 1305 1310 1315	4293
ata cat gga cag gac aaa tca gat gtt caa aac act cag cta aca gtg Ile His Gly Gln Asp Lys Ser Asp Val Gln Asn Thr Gln Leu Thr Val 1320 1325 1330	4341
gaa acg aca aat ata gaa ggc act att tcc tat ccc ctg gaa gaa acc Glu Thr Thr Asn Ile Glu Gly Thr Ile Ser Tyr Pro Leu Glu Glu Thr 1335 1340 1345	4389
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aca gat att cct tac att gtg tgg gaa gct gca gtg caa gct gag caa Thr Asp Ile Pro Tyr Ile Val Ser Glu Ala Ala Val Gln Ala Glu Gln 1415 1420 1425	4629

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Lys Glu Gln Phe Ala Asp Met Gln Asp Glu His His Val Ala Glu Ala	
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Met Glu Asn Leu Leu Ser Val Lys Pro Asp Gln Thr Leu Gly Phe Pro	
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Cys	Asp	Gly	Ser	Gly	Arg	Ala	Ser	Asp	Ile	Leu	Ser	Phe	Ala	His	Lys
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Gln	Leu	Phe	Ala	Ile	Ile	Met	Glu	Cys	Met	Lys	Lys	Lys	Glu	Leu	Val
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Pro	Thr	Asp	Ser	Lys	Ala	Thr	Glu	Lys	Glu	Lys	Lys	Pro	Pro	Met	Ala
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Pro	Lys	Ala	Leu	Lys	Leu	Leu	Gly	Met	Glu	Asp	Asp	Glu	Pro	Pro	Ala
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Lys Thr Asp Val Ile His Gly Gln Asp Lys Ser Asp Val Gln Asn Thr
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